Conclusions: Our data suggest that CPC are mobilized in STEMI patients in response to the total myocardial ischemic insult, as represented by the area-at-risk on T2-STIR. Furthermore, CPC positive correlation with PD suggests that they could be mobilized in attempt to overcome ongoing microvascular dysfunction.

TCT-387

Clinical Impact of Epicardial Adipose Tissue volume measured by MSCT - Association with subclinical coronary atherosclerosis

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Aim: Adipose tissue surrounding coronary arteries may contribute to the development of coronary atherosclerosis given its localization and potential for local production of inflammatory cytokines. The correlation between epicardial adipose tissue (EAT) measured by multi-slice CT (MSCT) and coronary atherosclerosis was investigated.
Methods: We investigated consecutive 334 cases underwent 128-MSCT for evaluation of suspected coronary artery disease. EAT was quantified by calculating the volume of CT density within epicardium showing -250HU<CT density<-50HU. The volume of EAT indexed by BSA was defined as EATV. We investigated correlation between EATV, various measurements, and severity of coronary artery atherosclerosis.
Results: Results are shown in table. EATV was significantly higher in the patients with coronary artery atherosclerotic plaque. In the patients with coronary artery atherosclerotic plaque, EATV of the patients with significant coronary artery stenosis was not different from that of the patient without significant stenosis. Multiple logistic regression analysis demonstrated increased EATV (>50cm^3/m^2) was strong factor of coronary artery atherosclerosis (OR=2.90, 95%CI=2.19-3.82, p<0.0001).

	plaque (+), n=215	plaque (-), n=119	p value
EATV	65.3±23.2	48.5±26.3	<0.0001
BMI	23.4±3.2	22.2±3.9	0.01
Ca score	165.5±503.4	75.4±240.7	<0.0001
DM, %	14.5	15.5	NS
HT, %	48.8	34.0	0.01
HL, %	72.8	59.3	0.02
	stenosis (+), n=120	stenosis (-), n=95	p value
EATV	64.6±25.8	66.1±19.7	NS
Multivariate analysis			
	odds ratio	95%CI	p value
EATV>50	2.90	2.19-3.82	<0.0001
DM	1.77	1.38-2.29	<0.0001
HL	1.47	1.11-1.97	0.008
HT	1.43	1.06-1.93	0.02

Conclusions: In our study, EATV correlates with coronary artery atherosclerosis. Increased EATV might contribute to the development of coronary artery atherosclerosis.

TCT-388

The Role Of The Dual-source Computed Tomography In Evaluation Of Restenosis After The Left Main Coronary Artery Stenting, A Comparison With Coronary Angiography And Intravascular Ultrasound

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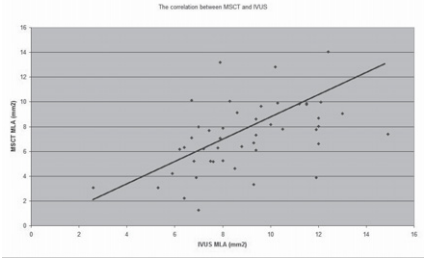
Background: Restenosis of the left main coronary artery (LMCA) after previous stenting is potentially associated with a fatal myocardial infarction or sudden cardiac death. The repeated coronary angiography (CAG) was widely accepted for the evaluation after the intervention to rule out a significant LMCA restenosis. The aim of this study was to determine whether dual-source computed tomography (DSCT) is an accurate method in the evaluation of the LMCA after percuteneous coronary intervention with stent implantation.
Methods: We prospectively enrolled forty-two consecutive patients (male 55 %, average age 67.5 ± 11.7 years) for follow up CAG, intravascular ultrasound (IVUS) and DSCT examinations after LMCA stenting (4 and 9 months follow up for drug-eluting stents, and 3 and 6 months for bare-metal stents, respectively). Restenosis was defined by CAG as 50 % or more of luminal diameter loss, by IVUS and DSCT as minimal luminal area (MLA) less than 6 mm2. IVUS measurement was considered as "gold standard".
Results: Forty-eight complete examinations were performed. We found 3, 6 and 13 restenosis according to IVUS, CAG and DSCT. Positive predictive values of CAG and DSCT were 50 % and 23 %, in contrast to 97 % and 82 % negative predictive values. The correlation coefficient between DSCT and IVUS for MLA was 0.50. There were no relevant complications during all the examinations.



Conclusion: The positive predictive value of DSCT seems to be limited, in opposite to favourable negative predicive value. Thus DSCT is a useful, non-invasive method in the evaluation of restenosis after LMCA stenting. Hovewer, the finding of restenosis should be re-evaluated by CAG and eventually by IVUS.

TCT-389

Evaluation of Total Endoscopic Coronary Artery Bypass Surgery (TECAB) by Intraoperative Angiography and Postoperative Multislice Computer Tomography

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Objective: Total endoscopic coronary artery bypasss surgery (TECAB) is an innovative minimal invasive revascularization procedure requiring proof of immediate and short term patency of grafts to compete with conventional surgery or percutaneous coronary interventions.
Methods: In 77 patients (pts) after robotic coronary surgery (Da Vinci, Intuitive Surgical TM) - 55 arrested heart TECAB, 20 via sternotomy robotically assisted anastomoses, 2 beating heart TECAB - intraoperative coronary angiography was performed with a mobile C-arm (OEC 9800 TM, GE or Philips Veradius TM). Within 3 - 6 months after surgery, all pts underwent Multislice Computer Tomographic Angiography (MSCTA, Sensation 16 / 64 TM, Siemens Medical Systems, Erlangen) and invasive coronary angiography follow up.
Results: In 75 pts (97 %) bypass grafts could be visualized by intraoperative coronary angiography. Spasm of target vessels and/or bypass grafts (reversible after intraluminal nitroglycerine application) could be observed in 40 %. In 6 pts immediate surgical revision due to stenotic - occluded target vessel segments or anastomotic bleeding was required. No angiography related complications occurred. Follow up MSCTA and correlation to invasive angiography showed patent grafts in all pts investigated. MSCTA image quality of proximal bypass anastomoses was judged excellent, scanning quality of distal anastomoses was of lower quality, but still sufficient to judge patency.
Conclusion: The combination of intraoperative angiography and follow up MSCTA allows safe and high quality evaluation of immediate and short term outcome in innovative robotic coronary surgery.

TCT-390

Ischemia-directed Coronary Revascularization: A Cost Effective Role For Routine Cardiac Magnetic Resonance Imaging?

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Background: Since COURAGE, the clinical pathway that leads to percutaneous coronary intervention (PCI) in patients with chest pain has been the subject of intense scrutiny. Data from DEFER, FAME and COURAGE nuclear substudy make a persuasive case for ischemia-directed PCI. The frailty of both the exercise tolerance test (ETT) and diagnostic angiogram to achieve this concept raises the question as to whether more expensive non invasive tests, such as stress cardiac magnetic resonance imaging (CMR), should be used routinely in stable patients.
Aim: To determine whether routine use of a gold standard but expensive non-invasive test of ischemia (i) has a significant impact on the management strategy in patients being considered for revascularization and (ii) may be cost effective.
Methods: Between January 2007 and November 2009, 150 patients presenting to a single interventionalist for consideration of revascularization were referred for CMR. A detailed assessment of clinical history, indication for CMR, results and management outcome were recorded on a specially designed database.
Results: 150 patients underwent CMR with stress +/- gadolinium (median age 65; males 94%; previous positive ETT 11%). At index assessment, 64 (43%) patients had a raised troponin. Coronary angiography had been undertaken in 115 (77%) patients prior to referral for CMR and 45% had multi-vessel disease. The specific indication for CMR in 113 (75%) patients following angiography was to confirm the presence of inducible ischemia +/- viability prior to undertaking proposed revascularization by PCI (n=84) or CABG (n=17) or either (n=12). Ischemia was only demonstrated in 33 (29%) of the 113 patients and 13 (12%) went on to revascularization (PCI (n=10) or CABG (n=3)). Revascularization was deferred in the remaining 20 patients due to low burden of ischemia or lack of symptoms. 59% of patients with a positive ETT did not have evidence of ischemia on CMR. In total, 13 revascularization procedures were performed out of 113 candidates with an estimated financial saving of £348,366, even after allowing for the cost of CMR.
Conclusion: 88% of patients being considered for revascularization were managed with optimal medical therapy instead due to the absence of significant inducible ischemia on CMR. This evidence based approach resulted in considerable cost savings and avoided unnecessary patient exposure to procedural risk associated with revascularization. Our study also demonstrates an unacceptably high false positive rate associated with ETT. A randomized study is indicated.

TCT-391

***In Vivo* Quantitative Characterization of Aortic Atherosclerotic Plaques by Flat-panel Computed Tomography**

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Background: We have previously shown that Flat-panel computed tomography (FpCT) provides better spatial resolution than 64-channel CT (64-CT) and improve *in vivo* quantitative assessment of aortic atherosclerotic plaques.
Methods and Results: Lesions in 184 aortic histology sections from 6 Watanabe heritable hyperlipidemic rabbits were quantitatively compared with 64-CT (image thickness, 0.625 mm) and FpCT (image thickness, 0.150 mm) images. Images were re-oriented perpendicular to the vessel centerline. For detecting plaque, FpCT and 64-CT were not significantly different (sensitivity, 76 % vs 66%; *P*=NS). Although FpCT was significantly more sensitive (42 % vs 0%; *P*=0.000) for detecting eccentric lesions, the area under the curve (AUC) for FpCT (0.6) was not significantly different from that for 64-CT (0.45; *P*=NS). In detecting plaques with ≤10% lipid (low attenuation foci), FpCT was significantly more sensitive than 64-CT (24% vs 0.7%; *P*<0.00) and had a significantly greater AUC (0.6 vs 0.5; *P*<0.006). Additionally, FpCT was more sensitive (65% vs 0%; *P*<0.00) in detecting plaques with ≤5% calcium (high attenuation foci) but not in detecting branch points. Both FpCT and histology allowed us to detect low-attenuation foci as small as 0.3 mm in diameter, whereas 64-CT allowed us to detect only low-attenuation foci ≥1.5 mm in diameter.
Conclusions: Flat-panel CT seemed to have more potential for quantitative screening low risk small atherosclerotic lesions, whereas 64-CT was apparently more useful when imaging established, well-characterized lesions particularly when measuring the vascular wall thickness in a rabbit model of atherosclerosis. Further longitudinal studies are needed to explore the maximal capabilities of this

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new imaging modality for early and accurate assessment of different models of atherosclerotic lesions.

TCT-392

Reduction Of Scatter Radiation During Transradial Percutaneous Coronary Angiography: A Randomized Trial Using A Lead-free Radiation Shield

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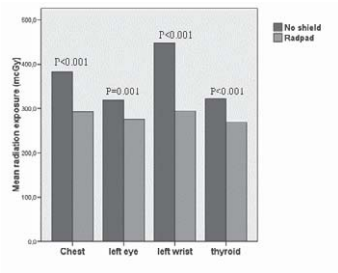
Background: Occupational radiation exposure is a growing problem due to the increasing number and complexity of interventional procedures performed. Radial artery access has reduced the number of complications at the price of longer duration of the procedures. Radpad® scatter protection is a sterile, disposable bismuth-barium radiation shield which has never been tested in a randomized study in humans.
Methods: 42 consecutive patients undergoing coronary angiography were randomized 1:1 to Radpad® use or no shield. The shield was placed around the area of sheath insertion and extended laterally. All procedures were performed by one single interventional cardiologist using right radial artery access only. Radiation exposure was measured blindly using thermoluminescence dosimeters positioned at the chest, left eye, left wrist, and thyroid.
Results: Despite similar fluoroscopy time (3.52±2.71 vs. 3.46±2.77 min, p=0.898) and patient absorbed dose (50.5±30.7 vs. 45.8 ±18.0 Gy/cm2, p=0.231) the mean total radiation exposure to the operator was significantly lower when Radpad® applied (282.8±32.55 vs. 367.8±105.4mcGy, p<0.0001) corresponding to a 23% reduction. Mean radiation exposure was lower with Radpad® in all locations (figure) ranging from 13% to 34%reduction.



Conclusions: This first-in-men randomized trial demonstrates that Radpad® significantly reduces occupational radiation exposure during coronary angiography performed through right radial artery access.

Oral Phamacological Agents

(Abstract Nos 393-398)

TCT-393

The Effects Of Pitavastatin On Regression And Compositional Changes Of Plaque In Patients With Acute Myocardial Infarction

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[1]Heart Center of Chonnam National University Hospital, Gwangju, Korea, Republic of[2]Konyang University Hospital, Daejeon, Korea, Republic of[3]Chung-Ang University Hospital, Seoul, Korea, Republic of[4]Keimyung University Dongsan Medical Center, Daegu, Korea, Republic of[5]Gachon University Gil Medical Center, Incheon, Korea, Republic of[6]Korea University Guro Hospital, Seoul, Korea, Republic of[7]Daegu Catholic University Medical Center, Daegu, Korea, Republic of[8]Seoul National University Bundang Hospital, Seoul, Korea, Republic of[9]Hanseo Hospital, Busan, Korea, Republic of[10]Wonkwang University Hospital, Iksan, Korea, Republic of

Background: There are very limited data regarding the effect of pitavastatin (Livalo®) on regression and compositional changes of plaque in acute myocardial infarction (AMI) patients.
Objectives: We used serial virtual histology-intravascular ultrasound (VH-IVUS) to assess the efficacy of pitavastatin (dosage: 2mg/day) on plaque regression and compositional changes in non-intervened non-significant lesions in AMI patients who were enrolled in Livalo® in Acute Myocardial Infarction Study (LAMIS).
Methods: A total of 50 lesions in 50 patients were evaluated using serial [baseline and follow-up (mean 7.7 months)] VH-IVUS analysis retrospectively. Efficacy parameters included changes in percent atheroma volume and plaque composition. The percent atheroma volume (PAV) was determined using the formula: PAV=100 X [∑ (EEM area-lumen area) / ∑ (EEM area)]. VH-IVUS analysis classified the color-coded tissue into four major components: green (fibrotic, FT); yellow-green (fibro-fatty, FF); white (dense calcium, DC); and red (necrotic core, NC).
Results: Low density lipoprotein-cholesterol (LDL-C) and high sensitivity C-reactive protein (hs-CRP) levels reduced from 123±34 mg/dL to 86±20 mg/dL (30% decrease, p<0.001) and from 0.89±1.45 mg/dL to 0.23±0.41 mg/dL (74% decrease, p<0.001). Plaque was regressed in 64% of the lesions and PAV was decreased from baseline to follow-up (Δ=-0.2%, p=0.014). Absolute NC volume (ΔFT; +1.50±8.19 mm^3, p=0.024, ΔFF; +1.08±7.65 mm^3, p=0.005, ΔDC; +0.38±2.78 mm^3, p=0.005, ΔNC; -0.66±5.58 mm^3, p=0.002) and relative NC volume (Δ%FT; +2.3±8.5%, p=0.002, Δ%FF; -0.5±7.2%, p=0.017, Δ%DC; +0.4±4.9%, p=0.018, Δ%NC; -2.2±7.5%, p=0.001) were decreased effectively from baseline to follow-up. Follow-up LDL-C did not correlate with changes (Δ) of absolute and relative plaque components, however, follow-up hs-CRP correlated with changes (Δ) of absolute and relative necrotic core volumes (r=0.475, p=0.026, and r=0.434, p=0.043, respectively).
Conclusions: Usual dose of pitavastatin (2mg/day) decreased LDL-C and hs-CRP levels effectively, and it had effects on plaque regression and compositional change in non-culprit, non-intervened segments in AMI patients in LAMIS. Not follow-up LDL-C but follow-up hs-CRP was associated with changes of plaque components by statin treatment in AMI patients.

TCT-394

CCR2 Antagonist Inhibits Neointimal Proliferation Post Coronary Stent Deployment

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Background: Using porcine coronary arteries, the efficacy of the novel, selective CCR2 antagonist CCX140-B, was evaluated for its ability to inhibit neointimal proliferation following bare metal stent deployment.
Method: Twenty four bare metal stents were deployed in the coronary arteries of 6 swine (9 in LAD, 6 in LCX, 9 in RCA). The deployed stent length and diameter were the same for each group: diameter 3.2±0.6mm, length 12.8±2.4mm. Two days prior to stent deployment, CCX140 (dissolved in 1ml of 0.9% saline) (treated group, n = 3) or placebo (control group, n = 3) was injected intramuscularly and continued for 28days post stent deployment. The dose of CCX140-B was chosen to achieve >90% receptor coverage (A10) during the course of the experiment. This dosing level resulted in two pigs displaying the expected drug levels at the end of study (A10) while one pig showed lower than expected drug levels (A3). At 28 days post stent deployment several analyses of in-stent restenosis were performed, including coronary angiography, optical coherence tomography (OCT), and intravascular ultrasound (IVUS). The swine were then sacrificed and histological analysis of stented arteries was performed.
Results: Percent neointimal volume obtained by OCT and IVUS was significantly lower in the CCX140-B treatment group with A10 trough drug levels than in the placebo group (29.7±13.7 vs. 43±13.7%, p=0.02). Percent area stenosis obtained by all analytical methods was significantly lower in the CCX140-B treated group with A10 trough drug levels than in the placebo group (27.4±3.4 vs. 39.6±2.8%, p=0.004). Moreover, the stented lumen volume was comparable across all groups (9.4±2.6 vs. 9.3±2.3, p=n.s), indicating that CCX140-B did not work by increasing vessel volume, but through inhibiting neointimal proliferation.
Conclusion: In conclusion, the results of our study suggest that systemic CCR2 antagonism (>90% receptor coverage) by CCX140-B significantly inhibits neointimal proliferation post bare metal stent deployment in a porcine model.

TCT-395

Three-year Clinical Outcomes From The OLIVUS (Impact of Olmesartan on Progression of Coronary Atherosclerosis; Evaluation by Intravascular Ultrasound) Trial

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The Sakakibara Heart Institute of Okayama, Okayama, Japan

The OLIVUS trial, using volumetric IVUS, reported a positive role in achieving a potentially lower rate of coronary atheroma progression through the administration of Olmesartan, an angiotension-II receptor blocker (ARB), for stable angina pectoris (SAP) patients requiring percutaneous coronary intervention (PCI). However, the benefits between ARB administration on long-term clinical outcomes and serial atheroma changes by IVUS remain unclear. Thus, we examined the 3-year clinical outcomes from OLIVUS according to treatment strategy with Olmesartan.
Methods: In the OLIVUS trial, serial volumetric IVUS examinations (baseline and 14 months) were performed in 247 patients with SAP. When patients underwent PCI for culprit lesions, IVUS was performed in their non-culprit vessels. Patients were randomly assigned to receive 20-40mg of Olmesartan or control, and treated with a combination of □-blockers, calcium channel blockers, diuretics, glycemic control agents and/or statins per physician's guidance. Three-year clinical outcomes and annual progression rate of atherosclerosis, assessed by IVUS (mean lengths 43mm), were compared with major adverse cardio- and cerebrovascular events (MACCE).
Results: Cumulative event-free survival was significantly higher in the Olmesartan group than in the control group (p=0.03; log-rank test). By adjusting for validated prognosticators, Olmesartan administration was identified as a good predictor of MACCE (HR 0.76, 95%CI 0.45-0.89; p=0.041). On the other hand, patients with adverse events (n=17) had larger annual atheroma progression than the rest of the population (23.8±18.7% vs. 2.1±13.8%, *P*<0.001).

	Control	Olmesartan	P-value
N=	121	126	
14 months Follow-up (%)			
Plaque Volume Change	5.4±15.5	0.6±12.9	0.016
In-stent Restenosis	10.7	7.9	0.42
3 Years Follow-up (%)			
Composite *MACCE*	21.5	11.1	0.027
Cardiovascular Death	5.0	6.4	0.66
Cerebral Infarction	2.5	0	0.08
Myocardial Infarction	2.5	0.8	0.30
Unstable Angina	5.0	1.6	0.15
PCI of new de novo coronary lesions	4.1	1.6	0.24
Deterioration of Chronic Heart Failure	2.5	0.8	0.30
In-stent Restenosis(from14 months to 3 years)	5.0	4.8	0.58

Conclusions: Olmesartan therapy appears to confer improved long-term clinical outcomes. Atheroma volume changes, assessed by IVUS, seem to be a reliable surrogate for future MACCE in this study cohort.

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